"ATLAS"
Advanced Technology Life-cycle Analysis System

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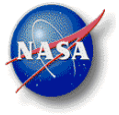


Contents

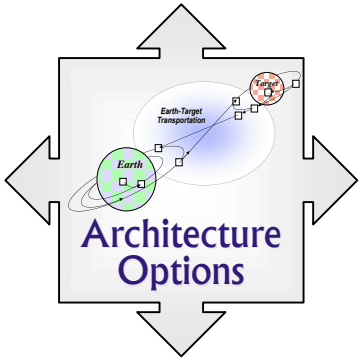
Overview

- **Making good decisions concerning research and development portfolios—and concerning the best systems concepts to pursue—as early as possible in the life cycle of advanced technologies is a key goal of R&D management**
- **This goal depends upon the effective integration of information from a wide variety of sources as well as focused, high-level analyses intended to inform such decisions**
- **The presentation provides a summary of the Advanced Technology Life-cycle Analysis System (ATLAS) methodology and tool kit…**
  - ATLAS encompasses a wide range of methods and tools
  - A key foundation for ATLAS is the NASA-created Technology Readiness Level (TRL) systems
  - The toolkit is largely spreadsheet based (as of August 2003)
- **This product is being funded by the Human and Robotics Technology Program Office, Office of Exploration Systems, NASA Headquarters, Washington D.C. and is being integrated by Dan O'Neil of the Advanced Projects Office, NASA/MSFC, Huntsville, AL**

"ATLAS" Approach
Advanced Technology Life-cycle Analysis System

Science & Research Challenges

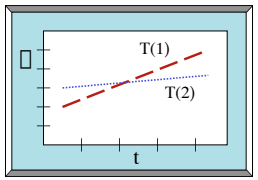
Architecture Options



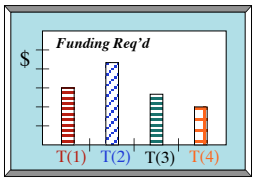
Systems Concepts

Technology Inputs...

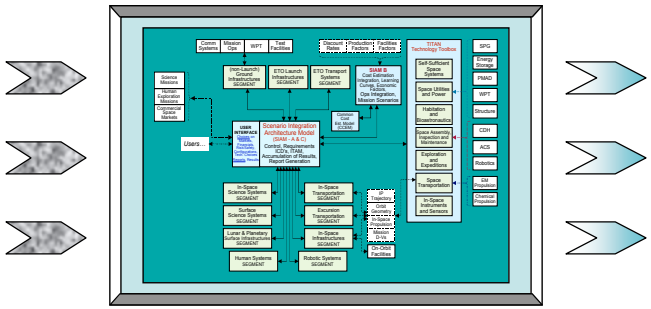
Forecast(s)



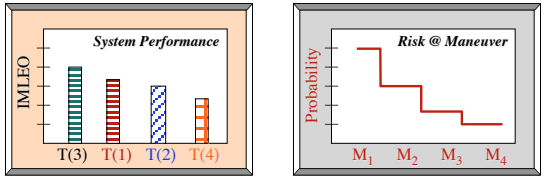
Plans & Road Map(s)



Systems Analysis & Modeling



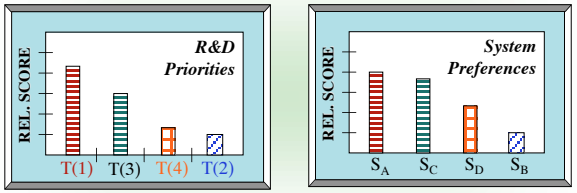
Engineering Analysis



System-Level (Performance)

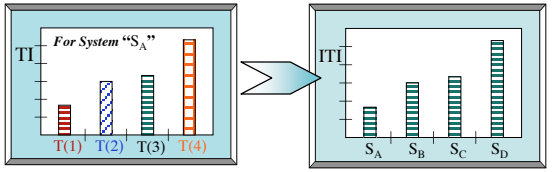
Mission-Level (Reliability & Risk)

R&D and System Priorities



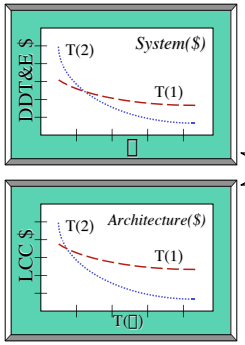
Single System Technology

Integrated Technology Analysis



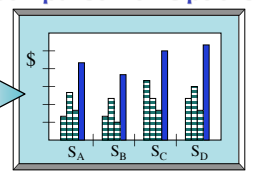
Systems-Technology Analysis Results

System-Level (Cost Sensitivity to R&D)



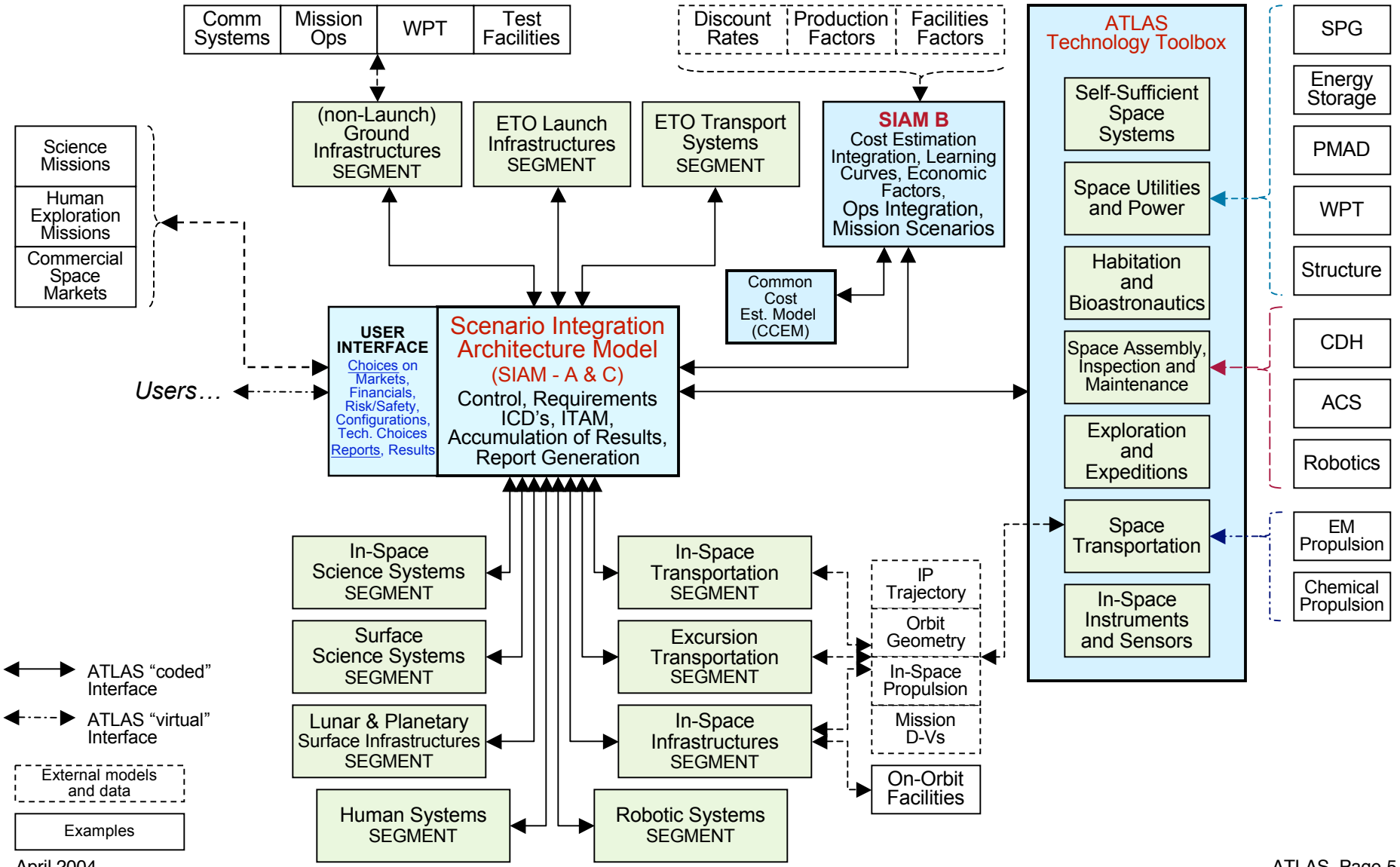
Architecture-Level (Cost Sensitivity to R&D)

Life Cycle Economic Comparison of Options



Cost & Economics Analysis Results

Advanced Technology Life-cycle Analysis System (ATLAS) Model
Architecture Overview



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Notional Example Analysis
Lunar Rover to Collect Ice from the Lunar Craters

- **Notional Scenario**
  - Launch elements to LEO for construction
  - LEO to Lunar Orbit
  - Base system/Rover to “Edge of Crater”
  - Rover descends into the crater to retrieve some ice
  - Rover brings the ice back to the base unit
- **Analyst chooses(with help from ATLAS)**
  - Launch Vehicle
  - LEO Base Configuration
  - Orbital Transfer Vehicle
  - Base Vehicle
  - Lunar Rover
- **Output Data from ATLAS**
  - Mass statement(s) for each subsystem and/or 18 subsystems
  - DDT &E (6 year cycle)
  - Cost for each system and/or 18 subsystems
  - Theoretical first unit cost
  - Life cycle costs
  - Views of the intermediate steps of the process

Summary

- **A central challenge in the management of innovation lies in making good decisions in the absence of complete information**
  - The conundrum is that the earliest decisions have the greatest affect on project outcomes, and yet they must be made at the time when there is the least detailed information available
- **The ATLAS modeling system is being developed to contribute to the resolution of this challenge**
  - By providing a single (high-level), desk-top tool that integrates information on, and analytical relationships among various missions, architectures, systems, technologies and associated metrics, and costs
- **Although considerable work remains, it appears likely that ATLAS will begin operations—and to make meaningful contributions to Agency decisions—during FY 2004**